ABOUT THIS MAP

Figure 4.9 shows a map of individual sightings of Steller sea lions (*Eumetopias jubatus*) at sea, along with the locations of haulout sites, rookeries, and at-sea effort in the study area. At-sea observations are based on combined data of several studies in the CDAS central California 1980-2003 data set. For context, the amount of combined survey effort (km of trackline) is shown, summarized in 10'x10' cells. Haulout and rookery locations are based on counts conducted by SWFSC in July 2002-2004.

DATA SOURCES AND METHODS

At-sea sightings and effort for the Steller sea lion are based on the CDAS central California data set (1980-2003), developed using software called Marine Mammal and Seabird Computer Data Analysis System (CDAS), by the R.G. Ford Consulting Co. This data set contains data from eight survey programs (five aerial surveys, three ship surveys) conducted between 1980 and 2003; the data extends from Pt. Arena to Pt. Sal in the study area. See the Data and Analyses section of this chapter for information on the at-sea survey data sets and mapping methods used.

Rookery and haulout data are provided by Mark Lowry of the Southwest Fisheries Science Center, NOAA's National Marine Fisheries Service, La Jolla, CA.. The rookery numbers represent a general range based on counts of all animals (pups and adults) in three years, 2002-2004. Haulout data are from three July counts (2002-2004), and are displayed as mean counts when occupied.

RESULTS AND DISCUSSION

The Steller sea lion ranges along the North Pacific rim, from northern Japan, the Aleutian Islands, Gulf of Alaska, and south to Año Nuevo Island, California (the southernmost rookery). Two separate stocks of Steller sea lions are now recognized within U.S. waters: the Federally Threatened Eastern U.S. stock (animals east of Cape Suckling, Alaska, 144°W), and the Federally Endangered Western U.S. stock, which includes animals at, and west of Cape Suckling (Loughlin, 1997; Angliss and Outlaw, 2005). Rookeries for the Eastern U.S. stock are located in Southeast Alaska, British Columbia, Oregon, and California, with none in Washington.

Steller sea lion females have a protracted lactation period (12-36+ months; Reidman, 1990) and females and pups are found at the rookeries year-round, but adult bulls are only at the rookeries during the breeding season (mid-May to mid-July for the Eastern U.S. stock; June-July at the Farallon Islands and Año Nuevo Island (Hastings and Sydeman, 2002; Morris, pers. comm.). Timing of pupping depends on maternal condition, thus any changes may reflect changes in environmental conditions (Reidman, 1990). In the study area, two of the most southerly haulout and breeding areas are located on the Farallon Islands, where Stellers breed in small numbers and haul-out in slightly larger numbers throughout the year (USFWS, 2000), and Año Nuevo Island (LeBoeuf *et al.,* 1991).

Because relatively few sightings (n=46 sightings; n=51 individuals) occurred in the CDAS data set in the study area, insufficient data precluded mapping the Steller sea lion data by seasons. Most of the at-sea sightings occurred over the shelf, with some over the slope, mainly in the area between Cordell Bank and Año Nuevo Island.

On the Southeast Farallon Islands, numbers of Steller sea lions have continued to decline (1974-1996) with a rate of decline of 5.9% per year for adult females; a 4.5% per year decline for immatures; and a significant decline in maximum number of pups (Hastings and Sydeman, 2002). Although the reduced numbers of Steller sea lions on the Farallon Islands has been driven by reduced numbers of adult females during the breeding season, it is unknown whether reduced numbers of adult females and immatures during this period is due to reduced survival, or changes in geographic distribution (Hastings and Sydeman, 2002).

At the Año Nuevo rookery, counts of Steller sea lions indicate the rookery is apparently stable, with total counts (live pups and non-pups) of 444, 480 and 561 in 2002, 2003 and 2004, respectively (Lowry, pers. comm.; Pitcher *et al.,* 2007).

At the Southeast Farallon Island rookery, pup counts were 7, 13, and 22 in 2002, 2003, and 2004 respectively. Total live counts of Steller sea lions were 119, 94, and 107 in 2002, 2003, and 2004 respectively (Lowry, pers. comm.).

Until the early 1970's, Steller sea lions used to breed at Point Reyes Headlands but in recent years (2000-2006) numbers have been low (usually fewer than five but as high as 23; Allen, pers. comm., 2006). The Steller sea lions at Point Reyes Headlands are composed of adult and sub-adult males and immatures. Only one female with a large pup was reported by a credible observer over the past 5 years (Allen, pers. comm., 2006). Haulout sites north of San Francisco are located at Fish Rocks, Northwest Cape Rocks, Russian River Rock, Bodega Rock, Point Reyes, and the Farallon Islands. Another haulout site not on the map is located north of Fort Ross at "Sea Lion Rocks"; maximum counts at this site occur in June (approximately 50) and consist mostly of females with pups of the year (Mortenson, pers. comm., 2003).

Adult males and juveniles disperse widely during the non-breeding season, however little is known on the movement patterns of Steller sea lions off central California. Tracking studies are being conducted on Steller sea lions, but mostly off Alaska. Lander and Gulland, 2003 reported a rehabilitated post-release Steller sea lion pup that was raised in captivity, released at sea near southeast Farallon Island in April 1996, and then traveled north and arrived in Coos Bay, Oregon in May 1996, when the tracking signal stopped. In California, it's thought the males travel north after the breeding season. Genetic studies suggest the California Stellers mix primarily with animals within the eastern stock, most likely animals in Oregon and Southeast Alaska (Lander, pers. comm., 2006).

Current trends in populations as reported by Angliss and Outlaw, 2005, indicate counts in Oregon have shown a steady increase since 1976. However, during 1980-2001, overall counts in California declined over 50%, with numbers remaining between 1,500 - 2,000 non-pups during 1990 - 2001 (Angliss and Outlaw, 2005). In northern California, numbers appear to be stable (Angliss and Outlaw, 2005).

Overall, threats to Steller sea lions include incidental take by commercial fisheries, illegal shooting, entanglement in marine debris, declining trends in prey availability, disease, and contaminants (e.g., premature births accounted for 20-60% of pup mortality in the South Farallon Islands between 1973-1983). Organochlorine and trace metal contaminant levels are still elevated in central California Steller sea lions (NMFS Biological Opinion, 2000). In the study area, habitat concerns include reduced prey availability, contaminants, and disease (Sydeman and Allen, 1997).

Steller sea lions feed on walleye pollock, capelin, mackerel, rockfish, herring, salmon, octopus and squid (Riedman, 1990); they are also known to feed on other pinnipeds. Predators of Steller sea lions include killer whales and white sharks.